Use and Abuse of Nasogastric Intubation

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• **The value of nasogastric intubation in the treatment of paralytic ileus and in some cases of mechanical obstruction, as well as in the preparation of obstructed patients for operation, cannot be denied. However, it is felt that intubation is oftentimes employed unnecessarily, and that the complications of this procedure are not fully appreciated. Fluid and electrolyte loss, sinusitis, parotitis, laryngeal obstruction, esophagitis, knotting and difficulty in withdrawing tubes and perforations of the gastrointestinal tract are complications that can occur when nasogastric intubation is employed.**

Two hundred consecutive operations on the gallbladder and bile ducts were reviewed, and the need for intubation in these cases was evaluated. It was needed in only 7.5 per cent of the cases in the series. In light of the hazards and the rather rare necessity for nasogastric intubation, "routine" use should be eschewed.

THE INTRODUCTION of intubation as a means of gastrointestinal decompression by Ward, Wangensteen and Paine will undoubtedly be regarded as one of the more important medical advances of this century. Nasogastric and intestinal tubes are of great value in the treatment of some cases of mechanical intestinal obstruction and paralytic ileus and in the preparation of patients with obstruction for operation. However it is wondered if intubation is not used too frequently in the "prevention" of abdominal distention.

It sometimes is not fully appreciated that nasogastric intubation can result in serious complications—some of which can be fatal. In fact the procedure is regarded so lightly by some physicians that the indication for use of the tube is simply an abdominal operation. This is indeed unfortunate.

Various complications of gastrointestinal intubation have been reported:

1. Fluid and Electrolyte Loss

This is perhaps the most frequent sequela of gastrointestinal decompression. It is regarded as a complication if the quantity and/or quality of fluid and electrolyte loss is not fully recognized. This loss becomes very pronounced when a patient on continuous suction is allowed fluids by mouth indiscriminantly. The same is true when the tube is frequently irrigated by the patient's attendants. Even with the aid of serum electrolyte and blood volume determinations, accurate replacement therapy is a genuine challenge. Prevention of these losses is usually easier than correcting them.

2. Discomfort to the Patient

How often have physicians listened to the patient's plea, "How long does this tube have to stay in?" Many times it appears that the tube causes more discomfort than the abdominal incision. This discomfort plus the other complications to be discussed, prompted Farris and Smith[5] to evaluate temporary gastrostomy as a substitute for nasogastric intubation. At last report they had performed this procedure in over 150 cases with impressive results. Although temporary gastrostomy has not yet received unanimous endorsement, it appears to be a worthwhile method of preventing distention in certain situations.

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3. Sinusitis, Otitis Media and Parotitis

Edema of the mucous membranes of the nasopharynx from the trauma of the foreign body (the tube) interferes with drainage from the sinuses and the middle ear. This can result in very annoying sinusitis or otitis media. The latter is more common in children.

Parotitis is likely to occur in the presence of poor oral hygiene and dehydration. To stimulate the flow of saliva it has been suggested that intubated patients suck on hard candy or chew gum. These measures might help to reduce the incidence of complicating parotitis.

4. Laryngeal Obstruction

Chaffee[3] mentioned 19 cases of laryngeal obstruction due to nasogastric intubation. In 15 of the patients tracheotomy was necessary, and four died. Farris and Smith[5] sent questionnaires to 200 members of the American Laryngological Society and the American Bronchoesophagological Society. They received reports of 79 patients who needed tracheotomy after intubation with nasogastric or intestinal tubes.

The primary pathologic change in this complication begins as a pressure necrosis of the esophagus at or near the attachment of the esophagus to the cricoid cartilage. This produces a perichondritis and ulceration of the larynx with subglottic stenosis.

Dyspnea, dysphagia, hoarseness, crampy cough and hemoptysis usually accompany this condition,

sometimes not occurring until several days after removal of the tube. Intubation does not have to be long continued for this complication to develop. Laryngeal obstruction has been reported in a patient who was intubated for only four days.

5. Esophageal Complications

Vinson[6] reported three cases of esophageal stricture necessitating dilatations. In the survey by Farris and Smith[5] reports of 22 patients who required esophageal dilatations were obtained.

A case of fatal hemorrhage from esophageal varices has also been reported. It was postulated that contact by the Miller-Abbott tube eroded the distended veins. It would seem, that except for the Blakemore-Sengstaken tube to control hemorrhage, intubation would be contraindicated in patients with esophageal varices.

6. Knotting of the Tube

Rehfus tubes are especially prone to knotting. Not only do they have a weighted olive at the tip, but they are usually used as a diagnostic tool in patients with normal gastric motility. Most knotted tubes are successfully removed through the nares—the knot having been pulled tight during the forceful withdrawal of the tube, but sometimes a knotted tube will have to be amputated at the nose, the remainder of the tube being permitted to pass per rectum, especially if the knot is beyond the pylorus or the ileocecal valve.

7. Difficulty or Inability to Withdraw the Tube

The tubes that are difficult to remove are usually those with a balloon at or near the tip. These bags act as a semi-permeable membrane, and gases will pass through from higher pressure areas to lower pressure areas. Hence the balloon can become considerably distended and obstruct the intestine. Surgical intervention is occasionally necessary to remove inflated bags. Allen and Welch[1] recommended the insertion of a needle through the intestinal wall at laparotomy to aspirate gas from the distended bag. The small needle-hole can then easily be closed.

After analyzing the gases in these distended balloons, Cantor[2] suggested that they be made of neoprene-G, as this material is not as permeable to carbon dioxide. Distention of the balloon on a Cantor tube can be prevented by inserting the stylet of a No. 21 gauge needle between the bag and the tubing before tying on the bag. After the tying, the stylet is removed. A ligature tied in this manner will permit gas to escape but not metallic mercury.

8. Breakage of the Balloon

Occasionally the balloon on intestinal tubes will rupture. This usually occurs during attempts at forcible withdrawal. Metallic mercury in the intestinal tract generally causes no ill effects. However, particles of this material can lodge in diverticula or within mucosal folds and bring about abscesses or fistulae. Drouillard and co-workers[4] reported a case in which the patient bit the balloon during removal. The mercury was aspirated into the patient's lungs. No untoward reaction ensued from this unusual accident, although at last report there was still mercury in the lung fields on x-ray examination.

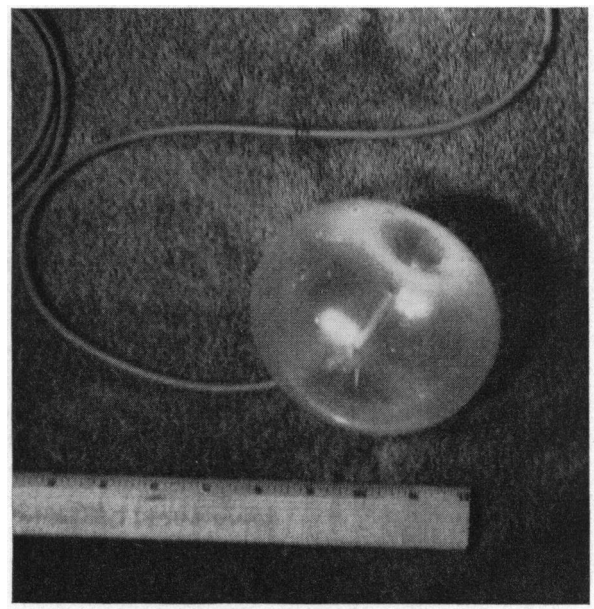

Figure 1.—Picture shows size of balloon on Miller-Abbott tube when inflated with 720 cc. of water.

9. Perforation of the Stomach or Intestine

Perforations of the esophagus, stomach and small bowel have all been reported. This catastrophe can occur through an apparently normal viscus as well as through a diseased organ. In one instance the tip of a tube perforated a gastric carcinoma. This complication can largely be prevented by changing the position of the tip of the tube each day by withdrawing or advancing it a few inches.

In the past few months I have seen two complications from intestinal tubes. The first was in a patient in whom paralytic ileus had developed following a resection of the sigmoid colon. In an effort to relieve the ileus a Miller-Abbott tube was passed. Two cubic centimeters of mercury was introduced into the balloon. After 48 hours the bag had not entered the duodenum, although an x-ray study showed that the tip was pointing directly at the pylorus. An attempt was then made to withdraw the tube, but it could not be delivered. Syringe suctioning on the "Pilling"* opening yielded 720 cc.

*These limbs on some tubes are marked "Bitner" or "Melcher."

of water. The tube was then easily removed. The patient's nurses admitted irrigating the tube rather freely. (The size of the balloon when inflated with 720 cc. of water is shown in Figure 1.)

To prevent the instillation of irrigating fluids through the wrong opening, I now generously tape the limb marked "Pilling" and write specific orders not to remove the tape.

The second complication occurred in a patient who had undergone an exploratory laparotomy for upper gastrointestinal hemorrhage. An enterotomy in the jejunum had been done as a part of that exploration. After operation a partial intestinal obstruction developed and a Kaslow tube was passed. The obstruction became complete, and it was felt necessary to reoperate. Because the Kaslow tube had been in the upper small bowel for six days, and because it was realized that the balloons on these tubes can absorb gas, it was deemed advisable to remove the tube and insert a new one before operation. Moderate difficulty was experienced in removing the tube. When the distended bag entered the pharynx and protruded from the mouth, it was obvious why more traction than usual was necessary, for the balloon had absorbed gas and was fully distended. When the balloon extruded from the patient's mouth, the bag was amputated and the rest of the tube was withdrawn through the nose.

In an effort to determine whether nasogastric suction is being employed too frequently as a prophylactic measure, 200 consecutive operations upon the gallbladder and bile ducts were analyzed. The author and his associates do not use nasogastric suction routinely in such cases. It was found that intubation was employed in 15 of the 200 cases reviewed. In seven instances it was used prophylactically for patients in whom severe ileus was expected. In the other eight the tube was indicated for gastric dilatation, vomiting or unrelenting hiccoughs. Serious difficulty did not develop in any of this group because the gastric tube had not been passed either preoperatively or in the immediate postoperative period. In only one patient was the tube used more than 24 hours. The remaining 185 patients recovered uneventfully from their operative procedures without need of intubation. As a matter of fact if patients are denied all fluids by mouth after operation until active peristalsis is regained, they will swallow little or no air, and distention will not be a problem. Postoperative ileus can often be handled in this manner.

It is realized that nasogastric intubation is a very useful tool in certain situations. However the complications that can result from the use of gastric or intestinal tubes should be kept in mind so that the tubes can be employed intelligently and cautiously. It is felt that prophylactic intubation is used too frequently.

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REFERENCES

1. Allen, A. W., and Welch, C. E.: Surgical Treatment of the Abdomen, J. B. Lippincott Co., Philadelphia, 1947.

2. Cantor, M. O.: Intestinal Intubation, C. C. Thomas Co., Springfield, 1949.

3. Chaffee, J. S.: Complications of gastrointestinal intubation, Ann. Surg., 130:113, July 1949.

4. Drouillard, E. J., Cox, W. B., and Blegen, H. M.: Unusual complications of intestinal intubation, Rocky Mtn. M. J., 51:1063, Dec. 1954.

5. Farris, J. M., and Smith, G. K.: An evaluation of temporary gastrostomy—a substitute for nasogastric suction, Ann. Surg., 144:475, Sept. 1956.

6. Vinson, P. P.: Cicatricial stricture of the esophagus following vomiting and intubation; report of three cases, West Virginia M. J., 37:349, Aug. 1941.